



Editorial: Intelligent and Innovative Solutions for Future Communication Networks (AICON 2020)

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Editorial:

With the rapid development of social economy, human needs have gradually risen from basic survival needs to the pursuit of quality of life, so more and more emerging technologies have emerged. Especially artificial intelligence, how to apply it to next-generation communication systems and networks is a hot spot in the industry that researchers are chasing. This technology provides new ways of thinking and solutions for communications. In addition, other emerging communication methods are also constantly creating opportunities and challenges in signal processing, resource optimization, and subject integration, attracting attention of academics, industries, and governments. Building a comprehensive and intelligent network system is a long and difficult process. Breaking through bottlenecks and technical problems from each aspect of the system is an important strategy to promote its development, such as radar imaging, image processing, navigation and positioning. Therefore, innovative and potential theories and technologies will have full development prospects.

The goal of this special issue is to publish both state-of-the-art and predictive papers on recent advances selected

from the 2nd EAI International Conference on Artificial Intelligence for Communications and Networks (AICON 2020), which was held in Cyberspace during December 19–20, 2020. After the event, an open call was published to encourage the contributions presented at AICON 2020 to be extended and submitted to this special issue. After a rigorous review process, seven high quality papers were selected for publication, which are briefly reviewed in the following.

The first article, “Remote Sensing Image Super-Resolution Based on Lorentz Fitting”, propose a novel remote sensing image super-resolution method based on Lorentz fitting, to improve the reconstruction performance in actual application. This paper presents a flexible parametric blur kernel model based on a linear combination of Lorentz basic two-dimensional (2-D) patterns. The proposed model can provide flexible shapes for blur kernel with a different symmetry and non-smooth edge, which can model complicated blur due to various degradation factors accurately.

The second article titled “A General Matrix Factorization Framework for Recommender Systems in Multi-access Edge Computing Network” integrates the multi-access edge computing network into recommender systems to take fully advantage of base stations and user terminals. Considering the differences among user terminals, the authors propose a general matrix factorization framework that can adopt different matrix factorization-based recommender algorithms with one item-profiles.

In the next article with the title “JOSP: Joint Optimization of Flow Path Scheduling and Virtual Network Function Placement for Delay-Sensitive Applications”, the authors present a joint optimization approach of flow path scheduling and VNF placement, named JOSP, which explores the best utilization of bandwidth from two different aspects to reduce the network delay.

How to accurately compensate the Doppler shift is the main challenge for broadband satellite terminals. The fourth article titled “Frequency Offset Estimation Algorithm of High-Order MAPSK Modulation Signal Based on DFT”

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proposed a frequency offset estimation algorithm based on frequency domain window function iterative peaking search is proposed with high-order MAPSK signal models, considering both algorithm complexity and estimation accuracy. The variance of the new algorithm is derived mathematically, and performance curve compared with CramerRao Lower Bound (CRLB) is also simulated under various SNR (signal-to-noise ratio).

The fifth article, “Exploiting Knowledge for Better Mobility Support in the Future Internet” proposes two novel knowledge-driven mobility support approaches to comprehensively improve mobility support performance. Such approaches exploit knowledge such as network topology and movement trajectory to tweak the network for better mobility support performance. A cross-architectural quantitative evaluation framework covering two communication scenarios and 5 quantifiable metrics is proposed to evaluate mobility support performance.

The sixth article titled “Physical Violence Detection Based on Distributed Surveillance Cameras” proposes a physical violence detecting method based on distributed surveillance cameras. The cameras capture images, and extract human bone models with an improved OpenPose model. All the surveillance cameras form an Ad hoc network, and transfer the extracted bone models to the monitoring center. Aiming at the problem of missing bone points caused by occlusion, this paper proposes a key point filling algorithm to improve the bone models.

The last article titled “Building Space Coding Based on Beidou Grid Position Code” proposes a construction building space identification position coding technology to code the construction building that is based on the coding rules of the Beidou grid position code and its good scalability in the field of building spatial identification position coding. The coding rules and its application are introduced in the paper including coding index, code generation, and the corresponding query algorithm.

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